THE

VETERINARY JOURNAL

Editor :

FREDERICK HOBDAY, C.M.G., F.R.C.V.S., F.R.S.E.,
HONORARY VETERINARY SURGEON TO HIS MAJESTY THE KING;
MAJOR IN THE ROYAL ARMY VETERINARY CORPS.
HONORARY MEMBER OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION.
CORRESPONDANT ÉTRANGER DE LA SOCIÉTÉ DE MEDECINE VÉTÉRINAIRE DU BRABANT (BELGIUM).

Sub-Editor :

GLADSTONE MAYALL, M.R.C.V.S.

APRIL, 1919.

Editorials.

THE RISKS OF INTRODUCING FOOT AND MOUTH DISEASE INTO ENGLAND.

THE terrible losses which have been caused by foot and mouth disease during the early months of this year in the North of Italy have made it extremely necessary that steps shall be taken to prevent the introduction of the disease into Great Britain ; and the article on the subject which appears on another page of this Journal by our distinguished colleague Doctor Cav. Sacco, the chief veterinary officer to the Province of Cremona, is of exceptional interest at the present time.

This disease, ordinarily so mild in its effects, appears to have taken on a very virulent form this year, and thousands of cattle have died —in some cases the losses amounting to as much as 40 per cent. In quite a number of instances the animal has died suddenly and quite unexpectedly, just when the owner has thought all was going well.

The consequences, as may well be imagined, in a country where cattle are worked regularly every day, on the farms and in the streets, have been very serious, as not only have there been the individual losses, but all transport by cattle draught has been stopped, and all sales have been interdicted. It has been forbidden, in the affected areas, to move cattle under any pretext, and, as there has also been a shortage of horses, the agriculturist has been hard set as to what to do to get his land in order for what has necessarily to be done in the early months of the year.

Having an army in Italy and troops continually passing to and fro, there is considerable risk of the disease being carried to Great Britain, and special orders have wisely been issued by the Army authorities to prevent this contingency, and rigid methods of disinfection are being carried out at all the concentration and demobilisation camps before the men are allowed to proceed. It speaks well for the precautions taken that up to now no outbreak has been reported, and as the disease appears now to be somewhat diminishing in virulence, it is to be hoped that this scourge will not be one to be added to the list of those for which the time of war may legitimately be said to be responsible.

Our insular position is an asset which we cannot too much appreciate, and one has only to live in a country less favoured in this respect in order to realise the advantages, in so far as the prevention of the introduction of any fresh contagious disease is concerned, of having our country completely surrounded by a broad belt of sea.

INFLUENZA.

A DISEASE known as influenza has existed in horses for about 120 years. A similar complaint has been known in man for about the same space of time. Investigations into the cause of the malady have been searching and copious, but we are only able to state definitely that the disease is a specific one due to the action of a specific organism or virus. The bacillus of Schutz, the pasteurella equi, and Pfeiffer's bacillus all play a rôle, but they all appear to have been " weighed in the balances and found wanting." Clinicians and general practitioners have been more concerned in devising means to stay the ravages of the plague than to investigate its origin. In human circles 'flu masks, nasal douching, and throat gargling, keeping fit, avoiding ill-ventilated places and gatherings *en masse* have all been advocated, yet still the merry microbe goes on its way undaunted and in a great measure quite unchecked. As regards horses, which have been fairly immune the while influenza has been slaying its tens of thousands of humanity, the exercise of hygienic laws and common sense, together with a little simple medicine, have really been the veterinary surgeon's sole armoury for many a decade, and, thanks to the fact that we do not have such a number of weak constitutions to deal with in the first instance as the doctors, we get a very good percentage of recoveries. We know the virtues of efficient ventilation, prompt isolation, and the greater risks run where horses are crowded together in stables, barracks, depôts, or on board ship. As regards further remedial measures, we are not hopeful that any better ones will ever be devised. Medicine and therapeutics are really very much " up against it " as regards influenza. We do not wish to appear pessimistic, but we do consider

that to a great extent " vain is the help of man " to prevent an outbreak of influenza. Even if the ways and the identity of the causal organism were actually known, of what avail is it to try and stem the wave of an air-borne malady ? More possible would it seem to dam the falls of Niagara or to check the origin of mist and fog. The most intimate knowledge of a disease occasionally shows us how hopeless it is to even try to annihilate or defeat it. Man in his wisdom, and driven by expediency and circumstance, has everywhere multiplied the means by which to hurt himself. Earthquakes would do him little injury but for his houses of bricks and stone, and influenza would not exact so great a toll if he did not live, eat, travel, work, and amuse himself in masses. The mischief has been done in his case, and all that remains for the scientist to do is to alter temporarily the bad conditions as much as possible during an attack of the epidemic.

The mind of research workers will travel in the direction of vaccines and anti-toxins, but if the disease is due to an invisible and filterable virus they would still appear to be " up against it."

Perhaps there was more in the old humeral theories of disease than was supposed. Lymph seems to be a fluid less easily investigated than blood, and perhaps more capable of circulating disease germs and impregnating the system with them. The prevalence of influenza in man and its comparative coincident rarity in animals, seems to prove conclusively that there is no connection between the causal organisms in the two species. For years a very fatal, though not common, contagious pneumonia of horses (which many good veterinary surgeons think is a form of influenza) has existed. Fatal pneumonia has been a marked feature in the human outbreaks. Here, again, both in horses and men, " how vain is the help of man." The fresh-air fiend will do as much good as anybody against influenza, but some may doubt it, for it is reported that the distinguished doctors who recently met and discussed ways and means against influenza all agreed on the benefits of fresh air and efficient ventilation, and yet they carried on their deliberations in an ill-ventilated room with all the windows and doors shut, and thereafter there was no marked occurrence of the disease among them. G. M.

SUFFERING FOOLS GLADLY.

" THE heathen in his blindness bows down to wood and stone." Science knows many heathen ; and there are learned and educated men who encourage the ignorance of the heathen-like mind that flourishes in the midst of civilisation even to-day. The old fallacy of the wolf's tooth is still kept up, and its removal claimed to do wonderful things—from restoring a lost appetite to curing shying. Quite recently

we heard a graduate of our respected College seriously recommend cow-dung poultices for a horse with fever in the feet. No wonder, then, that the layman goes one better, and that a recent experience of our own where human fæces had been carefully plastered and bandaged on to a quittor is not an uncommon one. Why do nearly half of the dog-owning public believe that biscuits are the one and only suitable food for dogs? Where do they get their theories from that meat given to puppies causes distemper, or that milk diet produces worms? What a long lecture the man who does not suffer fools gladly could give to these people on the evil results of perpetual biscuit feeding and the benefits of milk for puppies!

At a recent meeting among the medical fraternity to discuss influenza and its prevention, only one voice seems to have been raised against gargling with Condy's fluid as a preventive, the procedure being classed by the altruist as a horrible one for the performer. There are many more gargles equally effective, much more pleasant, and quite as cheap, but something with a high colour, a nasty taste, and a smack of oxygen pleases the great majority of the heathen best, so why should the medical man dissent if his clients choose "to bow down to wood and stone"? Why should he educate them in the ways of pleasanter gargles? Is there a danger of their using them too often, and as a happy diversion, even when influenza only exists in countries so far away as Russia and Spain?

The caustic clam is still played up to even in an age that claims to be enlightened and humane. Thousands of records prove undeniably that such procedure is neither necessary, humane, surgical, nor up to date. Even Job would have sworn at the effect of the primitive rat-trap if it had been one of the curses inflicted on him, but we still have men that bow down to wood as prevailing against stones, and swear by it to get the better of them.

Are not many of the greasy, high-smelling, deep-coloured concoctions that many of us use merely an end for playing up to the imagination of the man who sees self-satisfying visions in a cloud of pungency and aroma, and mistakes coincidences for results? Has not part of the pall of mediæval quackery left its shadow on our pharmacy and therapeutics? We see the fallacy and condemn the faith that believes that a sliced onion put into a mare's or cow's vagina will cause the urinary organs to act surely and comfortably; we laugh at the heathen who believes that a red herring tied to a cow's tail will cause it to rise again, or that a horse chestnut carried in the pocket is a charm against rheumatism, but the subtler and more oblique forms of blissful and opaque ignorance are often encouraged and passed lightly by or acquiesced in by us. It ought to be the aim and end of all members of

an honourable profession to leave it better than they found it, to chase away ignorance, and uphold and point out the star of clear, beneficent knowledge ; but the power of boodle is great and its pursuit absorbing, and bunkum and flapdoodle are its two most powerful allies. G. M.

THE BOARD OF AGRICULTURE.

We have been a consistent and persistent advocate of the change notified below. It is a glaring anomaly that the Board has hitherto only existed as a second-class Government Department. The advisers, controllers, and administrators of agriculture have now a chance of fulfilling a great and glorious rôle in the future prosperity of our country.

Board of Agriculture.

When, in the House of Commons, Mr. Harry Hope moved that " as a necessary and immediate preliminary to agricultural reconstruction it is essential to reorganise the Board of Agriculture and to accord the Department the status, staff, and accommodation of a first grade Ministry," says the *Daily Dispatch*, Sir A. Griffith-Boscawen (Parliamentary Secretary to the Board of Agriculture) said he was glad to be able to announce on behalf of the Government that he was going to accept the motion. He was also authorised to say that the Government were prepared to bring forward the necessary measures, which would probably require legislation, and which would be introduced as soon as possible.

They realised that the Board of Agriculture must not be, as in the past, a mere negative department, simply carrying out certain Acts of Parliament. The Board, therefore, would be made a first-class office. They wished to set up an agricultural authority in each county.

There would also be a commercial department established.

If the experiment in sugar beet growing was successful, it would mean a considerable industry. Flax and hemp growing could also be greatly developed ; and it was also hoped to extend the tobacco growing experiment.

They further wished to introduce in various parts of the country where the land was suitable intensive farming, and also petite culture which had been so successful in France.

Sanction had been obtained for a number of demonstration farms to increase and improve market production. These farms would be run on commercial lines.

Original Communications

THE TRYPANOSOMES FOUND IN DOMESTIC MAMMALS IN SOUTH-CENTRAL AFRICA.

By Capt. H. V. HORNBY,
South African Veterinary Corps.

Trypanosomiasis is a class of disease due to protozoa of many species and even genera. To speak of it as synonymous with "Tsetse-fly disease" would be very erroneous unless, as I propose to do, we confine our attention to those forms of trypanosomiasis which affect domestic stock in South-Central Africa. In the countries of that sub-continent tsetse-flies and pathogenic trypanosomes are so intimately associated that extermination of the former brings about disappearance of the latter.

It is impossible, at the present time, to state the number of *species* of pathogenic trypanosomes known to science, because authorities do not agree on the point of what constitutes a *specific* difference. Some systematists, known as "splitters," would multiply species on the strength of the smallest differences in morphology or pathogenicity; on the strength of the former distinguishing between *T. brucei* (Plimmer and Bradford) and *T. ugandæ* (Stephens and Blacklock), and, on account of the latter, between *T. congolense* (Broden) and *T. nanum* (Laveran). Other systematists, known as "lumpers," point out that the morphological differences between *T. brucei* and *T. ugandæ* are no greater than those separating two strains derived from one trypanosome, one of which has been maintained under natural and the other under laboratory conditions, and that any difference between the pathogenicity of *T. congolense* and *T. nanum* can be made to disappear by passing the latter through a series of suitable tests. The most famous splitters of trypanosome species are probably Laveran and Mesnil, while Bruce is a recognised "lumper." Of the two systems the former is better science and the latter better practice, using the words in the sense of the motto of the R.A.S.E. Morphology, motility, pathogenicity, susceptibility to poisoning by drugs are all characters which can be altered by the changes of environment associated with passage through different vertebrate hosts, and to such an extent that to the protozoologist there is no problem as to whether, in single-celled animals and plants (take *B. anthracis* for an example) there is inheritance of acquired characters.

Notwithstanding the above remarks it must not be supposed that plasticity of the characters of trypanosomes is so great that every strain or species can, by passage through a series of vertebrates be made to resemble every other strain; for instance, although *T. brucei* may

turn from a polymorphic into a monomorphic type, no conceivable number of passages will reduce its average length to anything approaching that of *T. congolense.* So long as the limits within which a character (say length, or motility, or pathogenicity) of any two trypanosomes can be made to vary do not overlap, then none will deny that there is a *specific* difference between those two, and so there is no contention about *T. brucei*, *T. congolense*, and *T. vivax* being different species.

Roubaud (1913) recognised four fundamental types of African trypanosomes, basing distinctions on the evidence afforded by their methods of multiplication in flies. Yorke and Blacklock (1914) on the same grounds recognised three groups. Bruce (1914), as the result of the work of the Sleeping Sickness Commission of the Royal Society, also classified the African trypanosomes pathogenic to man and domestic animals into three groups, comprising nine species. As his classification, which is based on morphology, pathogenicity, and development, but not on cross-inoculation and serum-diagnosis, which he rejects as unsatisfactory, as tending to multiply species, is a good one, I shall quote as much of it as is necessary to embrace all the forms with which we have to deal :—

A. The *T. brucei* group.—This comprises the polymorphic parasites. They develop in the gut of the fly and then pass to the salivary glands, where they complete their development.

(1) *T. brucei* (1899. Plimmer and Bradford).

Synonyms : *T. rhodesiense* (1910. Stephens and Fantham).
T. ugandæ (1913. Stephens and Blacklock).

B The *T. pecorum* group.—Small and monomorphic. Development takes place in the intestine and proboscis, but the salivary glands are not invaded.

(1) *T. pecorum* (1910. Bruce).

Synonyms : *T. confusum* (1909. Montgomery and Kinghorn).
T. nanum (1905. Laveran).

(2) *T. simiæ* (1912. Bruce).

Synonym : *T. ignotum* (1912. Kinghorn and Yorke).

C. The *T. vivax* group.—Monomorphic and very active. Development takes place in the labial cavity and hypopharynx, but not in the intestine or salivary glands.

(1) *T. vivax* (1905. Siemann).

Synonym : *T. cazalboni* (1906. Laveran).

(2) *T. capræ* (1910. Kleine).

This classification, in its entity, is accepted by very few students of the subject. For instance, the identity of *T. brucei* and *T. rho-*

desiense is disputed by Taute (1913), Macfie and Johnston (1913), Yorke and Blacklock (1914), Maynard (1915), Laveran (1916), and others, while the elevation of *T. capræ* to the dignity of a species, instead of looking upon it as a variety of *T. vivax*, is criticised by Macfie (1916).

It is significant of the nature and extent of the differences by which some of the above-named authorities would separate species, that although Taute and Yorke agree that *T. brucei* is *not* identical with *T. rhodesiense*, yet, when presented with a polymorphic trypanosome common in the big game, the one calls it *T. brucei* and the other *T. rhodesiense*. The point is of great practical importance, however. For instance, the importation of cattle from Northern into Southern Rhodesia was hindered because the medical authorities thought that as these cattle had passed through fly-belts, in which both game and tsetse-flies harboured trypanosomes morphologically identical with those causing disease in man, they might be carriers of sleeping-sickness germs. Bruce, recognising only one species of polymorphic trypanosome in South-Central Africa, would have supported this opinion. Taute, on the strength of his failure to infect himself with game trypanosomes, would have said that, provided the cattle had not passed through a sleeping-sickness area, any infection they contracted would be harmless to man. A student from the Liverpool School of Tropical Medicine would have agreed that the cattle were a menace to human safety, but he would not have admitted that it was because they harboured the animal parasite found by Bruce in Zululand, in 1898, and named after him. On all morphological and pathogenical grounds other than the crucial one, which can only be settled by inoculating a large number of men, Bruce's contention is correct; but then why is it that sleeping-sickness areas do not coincide with the much larger areas of the distribution of his trypanosome? He tries to get over the difficulty by suggesting that most human beings are not susceptible to infection; but this contention can hardly be maintained in face of the invariably fatal nature of the disease. I have travelled in several sleeping-sickness districts and I have noticed how sporadic and localised are outbreaks of the disease compared with the uniform distribution of tsetse-flies infected with polymorphic trypanosomes. I don't think that sleeping-sickness has ever been contracted in Zululand, the country where Bruce first found the parasite he proclaims as the cause of sleeping-sickness. During the German East African campaign thousands of mounted men rode into thick "fly"; nearly all their horses contracted and died of *T. brucei* infection, but I never heard of a trooper contracting sleeping-sickness. I am writing this in Portuguese East Africa, where, during the past three months, I have

watched two thousand donkeys contract and die of nagana, but during that period I have not heard of any man of the Animal Transport who fell a victim to the disease—although two Motor Transport men did. The whole problem centres on the point of pathogenicity to man; from the purely veterinary viewpoint we need only recognise one species of polymorphic trypanosome as pathogenic to domestic mammals, and that is *T. brucei* (Plimmer and Bradford).

The other point of criticism that I raised in connection with Bruce's classification was the identity of *T. vivax* and *T. capræ*. Macfie (1916) says it is not improbable that the two are varieties of one species, and I agree that it is difficult to see in what *specific* way the two differ. Accordingly, until more evidence for their separation is forthcoming, I prefer to recognise only one species of Group C as pathogenic for domestic stock, viz. *T. vivax* (Siemann).

In connection with Group B it seems to me that the name given six years earlier should stand in place of the one given by Bruce in 1910. Accordingly I shall use the name "*T. congolense* (Broden)" instead of "*T. pecorum* (Bruce)."

Having dealt with these few criticisms we see that the number of species of trypanosomes affecting domestic mammals in South Central Africa is small, namely, four. Of these, three are of paramount importance, and these I intend to deal with at some length. The fourth is of considerably less interest to us, and I will now dismiss it in a few words:—

T. semiæ (Bruce) closely resembles *T. congolense* (to be described later), being perhaps a trifle larger and with a centrosome that is postero-laterally, rather than terminally, placed. Its natural reservoir is the warthog, and it is transmitted by *G. morsitans*. In the fly it develops in the gut and proboscis. It may be very pathogenic for the monkey and pig, but it undergoes a change of virulence with great rapidity. If a monkey and a goat be infected by means of flies, the monkey dies within a few days, but if an attempt be made to infect a monkey with goat's blood, the result is generally a failure. Passage through the fly appears to exalt its virulence; of 15 goats infected by flies 13 died, but three goats inoculated directly from warthog all recovered (Bruce and collaborators, 1913).

It may be that in days to come it will be possible to show that *T. semiæ* is not a true species, but only a variety of *T. congolense*. Until then, however, I shall accept Bruce's contention that it is one. Nevertheless, in view of its doubtful position and because its ravages are, in economic importance, not to be compared with those of the three which we are about to study in some detail, I do not think that it is an exaggeration when I say that the majority of trypanosomes found in

domestic mammals in South-Central Africa can be referred to the three species: *T. brucei*, *T. congolense*, and *T. vivax*.

Let us consider what are the distinguishing characters of these three trypanosomes:—

T. brucei (Plimmer and Bradford).—This is a polymorphic trypanosome, so that the blood of a naturally infected mammal contains parasites which vary considerably in size and shape. That the polymorphism is real and not due to mixed infection was demonstrated by Oehler (1914) by inoculation with a single trypanosome. Looking at a stained slide one can divide the observed parasites into three groups: (*a*) Long, slender forms, 24 μ to 38 μ in length by 1 μ to 1·5 μ in breadth, with centrally placed oval nucleus, small centrosome which is rarely terminal, clear or granular cytoplasm, well-developed undulating membrane, a posterior end which is more frequently truncated than pointed or rounded, and a long free flagellum. (*b*) Short, stumpy forms, 12 μ–20 μ by 2·5 μ–4 μ, with round or oval nucleus which is usually centrally placed, but not rarely lies almost as far back as the centrosome, posterior end usually rounded, and no free flagellum. (*c*) Intermediate forms 21 μ–23 μ by 1·5 μ–2 μ, either with no free flagellum or with a short one. Included within the second group are the not uncommon atypical forms suggestive of involution and phylogenesis. Atypical and posterior-nucleated forms are most frequently found when the blood is particularly rich in the short type. Individuals of all three groups are commonly seen while in process of longitudinal division.

In the fresh preparation movement is of a wriggling or squirming nature. Occasionally one sees an individual make a definite forward movement across the diameter of the field, and this is apparently accomplished only by the long forms; usually one notices only an aimless twisting with an occasional jerk forward. Often a trypanosome acts as though its anterior end were adherent to a corpuscle or mass of agglutinated corpuscles; in the former case pulling the cell about, and in the latter being localised in movement by the attached mass.

Strains kept for years under laboratory conditions tend to become monomorphic (Stephen and Blacklock, 1913), but slides taken from a naturally infected animal invariably reveal two or three forms. During the course of the disease set up by the parasites the proportion of one form to the other may vary. Oehler (1914) thinks that slender forms herald a multiplication and short forms a remission. Ogawa (1913) says that in chronic cases these predominate at first long, then short, and then again long, while in acute cases long forms predominate throughout. Referring to my case-book I find that of 35 slides taken

from that number of naturally infected equines I have noted that in 15 there is a predominance of long, in 12 of short, while in the remaining 8 there is more or less equal distribution of the two forms. Although not without exceptions, I have found, as a rule, that at the commencement of disease the slender forms predominate, whereas in the very advanced stages the stumpy forms, including many with posterior nuclei, are in the majority. Robertson (1912) working with *T. gambiense*, a parasite resembling the species under review, considered that the short form should be looked upon as the adult blood-type. He found it present almost exclusively during the periods when the parasite is scanty in the blood, and that the blood of the monkey is only infective when short forms are present in sufficient numbers. I do not think that these remarks apply to *T. brucei* ; certainly when parasites of that species are scanty the few individuals seen have frequently been slender in form, because, looking at my notes, I see such entries as " Tryps. scanty. Long and short " or " Three tryps. only found. All slender *T. brucei*."

Development in *Glossina* is in the alimentary tract, whence the parasites pass to the salivary glands. The form of the parasite in the glands approximates to that of the short blood forms. It is likely that all the common species of tsetse-flies are capable of acting as hosts ; certainly, as shown by Kinghorne, Yorke, and Lloyd (1912), by Macfie and Gallagher (1914), by Duke (1916), and others, *G. morsitans G. tachinoides*, *G. pallidipes*, and *G. brevipalpis* are so able. The commonest species in South Central Africa are *G. morsitans* and *G. pallidipes*, the former being predominant throughout Rhodesia, Nyasaland, " German " East Africa, and Portuguese East Africa west of the lake. East of Lake Nyasa *G. pallidipes* is the commoner.

The natural reservoirs of *T. brucei* are the big game, particularly the Bovidæ.

The range of pathogenicity of *T. brucei* is wide. Rodhain (1912) found mules, dogs, and a goat infected. Macfie and Johnston (1913) describe it as commonly found in equines but rare in cattle and sheep. Bevan (1913) found it in a dog and a goat. Bouillez (1916) describes it as a frequent cause of death in horses and asses, but that it is only rarely present in the blood of other species of domestic animals. Bruce, who is the leading authority on this trypanosome, gives the following range of pathogenicity for one strain, and, although another strain was less virulent for monkeys, goats, and guinea-pigs, these figures are approximately accurate when applied to the species. The strain was sent by Shilston from Zululand, who reports that it killed a horse in 35 days. The Commission (1914) found that two out of six oxen became infected, and one of these died in 310 days ; four out of seven

goats became infected, and died, on an average, in 77 days; eight monkeys died in from 8 to 65 days, average 29; seventeen dogs died in from 12 to 26 days, average 18·5; rabbits died in an average of 32 days; guinea-pigs between 15 to 89, averaging 44 days; rats in 27 days. *The only animals that recovered after infection was established were cattle, of which 83 per cent. died.* I have italicised the last sentence because it is a common error, reproduced in nearly all text-books, to refer to *T. brucei* as a parasite causing fatal disease in cattle. I have examined blood from hundreds of cattle "flystruck" in areas where I know *T. brucei* to be present, yet I have never known a naturally-infected ox to be seriously affected by a pure strain of this parasite. It has been a noticeable feature in the East African campaign how different have been the infections set up in the different orders of domestic mammals sent through the same "fly-belts"; whereas 90 per cent. of flystruck equines die from an almost pure *T. brucei* infection, flystruck cattle show in their blood only *T. congolense* and *T. vivax*. I inoculated an ox with blood from a donkey dying of *T. brucei* infection. There was a slight temperature reaction on the tenth day; from then to the eighteenth day a few trypanosomes, both slender and stumpy, could be found in the circulation, but after that no more were seen, and eventually the beast was sent to the abattoir in the same fat, healthy condition that he had maintained throughout the experiment. His temperature, however, did not become quite normal again during the six weeks that followed injection, and so, as Duke (1913) has shown to be the case in antelope, it is likely that the ox, although almost immune to the effects of *T. brucei*, may yet act as a carrier of infection. McCall, who for some years was A.D.V.S., E.A.F., and to whom I am much indebted for information and opportunity for study, told me that the average duration of life in "fly" of a horse is under two months, but that a mule survives longer. Of all the thousands of equines that have become "flystruck" during the East African campaign, the number that has recovered to the extent of becoming immune is under 0·1 per cent. Personally I have seen only some half dozen mules that appeared to be immune, and some of these I have still under observation. As a practical rule I reckon for horses and asses that, even under favourable conditions of food and work, 75 per cent. will be unserviceable after two months in "fly," while three months "wash out" all but a negligible fraction. In the case of mules, as McCall stated, the working life in "fly" is almost twice as long as that of a horse or donkey. I do not know what is the action of *T. brucei* on pigs, but summarising its action on the other domestic mammals we may say that it is fatal to equines and dogs, dangerous to sheep and goats, but almost innocuous to cattle.

T. congolense (Broden) is monomorphic, by which is meant that the *average* specimens of all populations of this species are alike; not as with *T. brucei*, where the average of a population of short forms is very different from that of a population of long forms. The extreme limits of length are 8 μ–20 μ, and of breadth 1 μ–2·5 μ, but an average measurement is 13 μ by 1·5 μ. The oval nucleus is centrally placed. The centrosome is small and close to the posterior end, which is usually blunt and rounded. The cytoplasm is generally clear, but occasionally contains granules. The undulating membraner is rather poorly developed. There is no free flagellum.

Movement in fresh preparations is twisting without any definite forward motion. Frequently the anterior end appears attached to a blood-cell, although the stained dried film never seems to show that this was the case.

The parasite is easily recognised by its small size, even when mixed with short forms of *T. brucei*.

Development in *Glossina* commences in the gut, but final production of "blood forms" takes place in the proboscis and hypopharynx. It appears to be probable that any species of *Glossina* can act as a host.

Big game, especially antelope, act as the natural reservoirs of *T. congolense*. Ground game, so-called vermin, and birds have never been incriminated.

In no other species of trypanosome is pathogenicity so variable a character. Thus one strain of Bruce's (1913), from an ox, killed dogs with certainty, while guinea-pigs and rats appeared to offer an absolute resistance, whereas a wild-game strain failed to kill dogs but killed five out of nine rats. da Costa and collaborators (1915) maintained one strain which caused fatal disease in rats, guinea-pigs, and dogs, although a monkey and goat recovered. A second strain gave rise to slight infections only in all the above-named animals. A third strain was inoculable into rats and rabbits, while dogs proved refractory. A fourth strain gave rise to slight infection in rats and rabbits only. Obtaining such results an investigator might be led into supposing that he was dealing with different species were he not aware that a strain virulent for laboratory animals can be rendered avirulent by passage through a goat (Bruce and collaborators, 1913, and Laveran, 1916). Rodhain and collaborators (1912) says *T. congolense* may set up acute or chronic disease in goats and dogs. Archibald (1912) describes it as pathogenic for ox, mule, goat, sheep, donkey, dog, and rabbit, while guinea-pigs were relatively immune. Macfie (1913) records its presence in cattle, horses, and sheep. Andrews (1912) says it causes death in cattle in 6 to 12 weeks, while sheep die frequently in less than a month after inoculation, although some live for a year.

Dogs die in two to five weeks. Jones (1915) records heavy mortality in cattle from it. Bevan (1916) and, if I remember rightly, von Saceghem, record it in pigs. I have seen a number of naturally infected equines, and in those rare cases where the infection was pure the disease ran a chronic and ultimately fatal course. One donkey gave the appearance of spontaneous recovery for, although showing slight intermittent fever, its blood remained negative for four months, and it put on condition. Nevertheless, in the end, it relapsed suddenly and died. A peculiar theory is that although *T. congolense* is pathogenic to equines, yet when these mammals pass through a fly belt and are bitten by flies infected with both species, it is rare to find any parasites in the blood other than *T. brucei*. Sometimes at the commencement of illness I have found both species in a stained film of donkey blood, but later on in the course of disease these have been demonstrable only; the latter, and inoculation of blood, even at a time when both parasites were present, into another donkey set up an apparently pure *brucei* infection. Once only have I found *T. congolense* at a late stage of an infection which in its early periods showed only the larger species. It seems, then, as if the presence of the polymorphic parasite rendered the blood unfavourable for the development of the small monomorphic one.

The vast majority of cases of bovine trypanosomiasis are due to *T. congolense*; quite 90 per cent. of the cases that have come under my observation have been so caused. Although local cases of cattle such as that described by Bouet (1916) on the West coast may show a very high degree of resistance, I do not know of any such immune herds in the countries of which I have experience. I have found the disease to be very fatal, although, as might be expected in the case of a species of such variable pathogenicity, the duration of illness may be anything from a month to two years. Spontaneous recovery is very rare. Sheep and goats offer more resistance, and one often sees ovine and caprine representatives left in a village after fly encroachment has killed all the cattle. Nevertheless, sooner or later, these animals succumb. Some Kafir dogs, too, are not easily infected. I remember inoculating one with the blood of a European dog that was dying of *T. congolense* infection, and I only set up a very transient illness. Nevertheless, if exposed to the continuous infection of a fly-belt, these dogs gradually die out. European dogs die rapidly from the disease. Pigs, too, appear to be very susceptible, but then microscopic examination is not sufficient to demonstrate whether a parasite causing fatal disease in pigs is really *T. congolense* and not *T. simiæ*.

T. vivax (Siemann) is monomorphic. The average length is 24 μ,

with extremes of 18 μ and 32 μ. The average breadth is 3 μ, with extremes of 2 μ and 4 μ. The nucleus is oval and lies near the middle of the body. The centrosome is large and lies close to the rounded posterior end. The cytoplasm is clear. The undulating membrane is rather poorly developed. There is always a long, free flagellum.

In the stained preparation a pure infection is readily identified, but with a mixed infection it is not easy to distinguish *T. vivax* from some slender forms of *T. brucei*. A typical specimen is fairly easily distinguished by its almost club-like form, its terminal nucleus, and clear cytoplasm.

In fresh preparations it is usually readily recognised by the rapidity with which it moves across the whole field ; there is something almost suggestive of purpose in its rapid course—so different to the apparently aimless twisting and sudden jerking forward movements of even the slender forms of the polymorphic species. One sometimes meets slower strains, as recorded by van Saceghem (1916), while Blacklock (1912) found that continuous passage through goats brought about some reduction of motility. In Portuguese East Africa I have met with a strain in oxen that was singularly slow ; in fact, I did not recognise the species in the moist preparation ; it was only by careful examination and measurement of the stained specimens that I found I was dealing with a trypanosome morphologically indistinguishable from *T. vivax*.

As with the other species, it is likely that all species of tsetse-flies can act as hosts. Development takes place only in the proboscis, the final infective forms being found in the hypopharynx.

Antelope form the chief reservoir.

It is not pathogenic for small laboratory animals, although Blacklock and Yorke (1913) after many attempts succeeded in setting up a mild infection in rabbits. Dogs, too, are nearly always resistant, but Macfie (1913) describes one case of natural canine infection. It is pathogenic for equidæ and ruminants, but, either because strains of virus differ considerably in virulence or because different strains of the same species of mammal vary in their susceptibility, the forms of disease it sets up vary greatly. Thus Rodhain (1912) says that it is practically non-pathogenic for goats, whereas Blacklock (1912) found that it killed them in 31 days. Bouffard (1912) describes it as virulent for the ox, sheep, and goat, and as the cause of chronic fatal illness in the horse. de Greef (1912) found that it set up a chronic illness in one horse, while in another it caused a mere keratitis. Macfie (1913) says it causes mild disease in horses, and that a small breed of cattle in Northern Nigeria are almost immune to its ill effects.

XUM

It is only rarely that I have met a pure infection of *T. vivax* in equines, but in those cases the disease set up has been similar to that produced by *T. congolense*, namely, a chronic one. I have met mixed infections of these two parasites, the presence of one not appearing to inhibit the multiplication of the other. As it is easily overlooked when mixed with *T. brucei* I am not in a position to state whether it can develop in blood infested by that parasite.

Although described by Macfie (1916) as the commonest trypanosome in cattle on the Gold Coast, this is not the case in South Central Africa. There it is found in less than 10 per cent. of flystruck bovines, although McCall (*vide supra*) has told me that it is common in certain "fly-belts" of "German" East Africa. When I have met with it in cattle it has set up a fatal disease similar to that caused by the smaller species. In short, for domestic equines and ruminants the pathogenicity of *T. vivax* is almost identical with that of *T. congolense*, for dogs it is less, while I am unaware of its action on pigs.

Summary.

(1) The common trypanosomes found in Domestic Mammals in South Central Africa are three in number, viz. :—*T. brucei*, *T. congolense*, and *T. vivax*.

(2) They are readily distinguishable by their morphological characters.

(3) *T. brucei* is very fatal to equines, smaller ruminants, and dogs, but is almost non-pathogenic for cattle.

(4) *T. congolense* is the commonest cause of trypanosomiasis of cattle, but it is also pathogenic ior the other domestic mammals.

(5) *T. vivax* resembles *T. congolense* in the forms of disease it causes in stock. Dogs are generally immune to its ill-effects.

(6) The distribution of these parasites is coincident with that of tsetse-flies.

(7) Different strains of the same species of trypanosome vary greatly in their range of virulence.

(8) Individuals and races of the same species of domestic animal vary greatly in the resistance they offer to infection.

(9) The presence in the blood of one species of parasite appears to inhibit the development of another.

(10) A fourth species—*T. simiæ*—causes disease in pigs. It is conceivable it may be only a variety of *T. congolense* modified by passage through the warthog.

MALIGNANT EPIZOOTIC APHTHA* (FOOT AND MOUTH DISEASE).

By Dgct. Cav SACCO,
Chief Veterinarian to the Province of Cremona, Italy.

A very grave form of epizootic aphtha has been travelling about Italy since the beginning of last December, and has already spread over Upper and Middle Italy. It is specially characterised by the great mortality which accompanies it. Very serious epidemic manifestations of this disease occurred in Italy in 1901, 1907, and 1912, although the rate of mortality was not high. Here in Lombardy, in certain byres with little more than 100 animals, 50 have been lost in a few days. Those who, like myself, have studied the disease at first hand have specially noted that from the start of and during this outbreak the greatest importance should be attached to hygienic and dietetic precautions. Many beasts die in places where, after the appearance of the disease, they are fed as usual, but in those where, after the first manifestation, the beasts are starved, and their litter removed, very few cases terminate fatally. All animals affected must be carefully kept short of food, but it is necessary to sustain them with plenty of coffee and wine.

Here at Cremona a well-known cattle proprietor used in his byres in the course of a few days 10 hectolitres of wine, many kilogs. of coffee, and managed to save all his 90 beasts, with the exception of one calf. One has noticed that animals attacked by aphtha in the usual slight form, after the usual short febrile period, return to their food with appetite, and just when the owner thinks them cured, are found lying dead on the ground. Before dying, these animals display intense constipation, so great that their dung is more like that of goats than oxen. The post-mortem examination shows the bowels highly inflamed with obstruction of the omasum, in which dry fæcal matter is found.

Absolute starvation for this, assisted by gastric and cardiac stimulants, frequent clysters of tepid water and soap—eight litres for adult oxen and of three litres for medium ones.

Contrary to what one has observed in former outbreaks, in which the affected beasts salivated freely only during the early part of the attack, one now sees this salivation renewed after every febrile period, and I have noticed working oxen 21 days after the inception of fever renewing the emission of abundant salivation and dying in a few days.

I repeat that it is most essential to starve the patient for at least ten days from the first accession of fever, at the same time administering tepid drinks with a small quantity of flour.

With respect to medicinal treatment, good results have been

*Translated by Capt. H. Somers, R.A.V.C.

XUM

obtained here by hypodermic injections of " collargolo," of " colloidal electro silver," of " chlorhydrate of quinine," but, above all, they have given best results when aided by the strict fasting already inculcated, and if given when the very first manifestation of the disease puts in an appearance. The hypodermic injections suggested by Prof. Cameillo Terni, director of the experimental station for infective diseases of cattle, etc., a valorous apostle of the strife against aphtha epizootica. Untiringly he travels Lombardy for months in all directions, gratuitously bringing the treasure of his practical advice and assistance. The composition of this invaluable receipt is as follows :—

R.	Alcohol at 95°	100 grammes.
	Sulphuric ether	100 ,,
	Physiological solution of chloride of sodium 0·75 per cent. in distilled water	100 ,,
	Acid. carbolic cryst.	15 ,,

Injection, 5—10—15 grammes of the solution for six consecutive days, and afterwards six more injections at intervals of one day, that is, before the appearance of the disease. As soon as the presence of aphtha epizootica is ascertained, double doses should be given. The three doses indicated above are for relatively small, medium, and full-grown animals. Attention should be paid not to administer the medicine near naked lights, or where anybody is smoking, as it is highly inflammable. It is important that the prescription, when made up bythe ph armacist, should be limpid, as its component elements must be properly and completely mixed. The alcohol should be of exactly 95°, otherwise a perfectly limpid mixture will not result.

Another remedy, and one which, perhaps, gives better results, because it was largely experimented with at Parma in 1912 by Prof. Finzi, of the Torino Veterinary School, is Kinarsenil.

But there is yet wanting in Italy such a product as will be in a few days be placed in commerce by the Tuscan Vaccinogene Laboratory of Prof. Sclavo, of Siena. A product which has given the most satisfactory results, especially in the gravest forms, injected in the veins of bovines, is the serum prepared under the name of " Anti-aftina " by the experimental station for infective domestic animal diseases of Milano. At the present moment the supply of this serum is limited for want of animals to experiment upon. Lately, however, the Minister of War has placed at the disposition of Brescin and Cremona many beasts, and in a fortnight at the latest there will be plenty of serum to dispose of—blood that the veterinarian can employ with the utmost confidence and soon observe its miraculous results. I have used it often myself, and have saved many bad cases.

I think it as well to warn veterinarians and cattle-keepers against certain blackguardly advertisements for what purport to be infallible cures for aphtha epizootica. As a matter of fact, the only kind they can cure is that of benign aphtha, which cures itself, without any remedy. The only effective remedies are based on subcutaneous injections, so that where grave and diffuse aphtha epizootica exists the presence of a veterinarian is necessary to administer daily injections. Here in Lombardy nearly all cattle-keepers do their own subcutaneous injecting, or, when they cannot themselves, their neighbour can probably do it for them. Moreover, some midwives (obstetricians) may usefully employ themselves in such work. It is important to save the capital represented by our cattle, and to leave nothing to chance to obtain the best results from the right means, and we should all bear in mind that heavy mortality among horned cattle would be irreparable for many years, as all the nations of Europe are to-day short of provisions. I trust that my advice, expressly written in simple form, will recommend itself to all, also to the cattle-keepers of the Allied nations, who, I hope from my heart, will not have suffered losses on the scale of those of the Lombard farmers.

ALOPECIA IN THE DOG, COMPLICATED BY CARCINOMA.

By HENRY B. EVE, M.R.C.V.S,

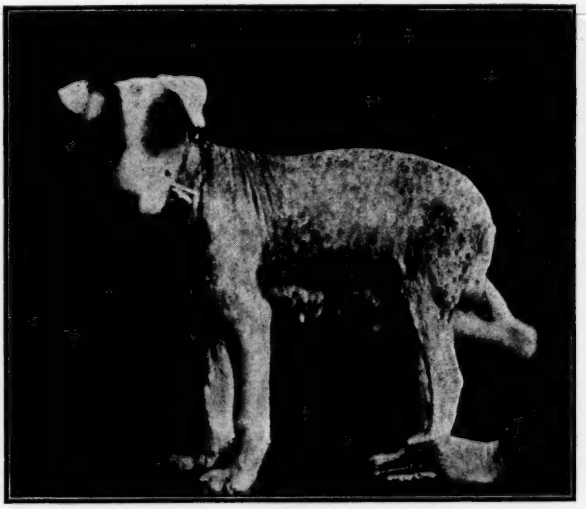
Folkestone.

Subject.—A fox-terrier, age about nine years, property of a lady: a very neurotic animal, been in daily contact with another, which up to date seems healthy.

History.—The dog had been treated periodically for about two years by several different veterinary surgeons, including myself, for skin disease, but without success. Last week the dog turned vicious, bit the owner, became paralysed, and had several attacks of convulsive fits, so I advised the owner to have it destroyed, which was done under chloroform. As it was a most interesting case, and defied all treatment, I had it photographed ere doing so, which clearly shows the condition of "alopecia" present (local). It suffered frequently from attacks of rheumatic neuritis and arthritis, for which disease I had treated it. Four years ago it had an accident which rendered the hind quarters useless for a time, but he soon recovered with treatment. Two cysts appeared on the thighs, and were removed surgically by a veterinary surgeon in London, and afterwards intense irritation of the skin developed on the chest and stomach; subsequently a serous watery fluid appeared in the breasts. The hair turned a deep yellow colour and came off, accompanied by a black pigment, and "alopecia" resulted.

This was diagnosed as an attack of "acute erythema," and duly treated.

Symptoms.—The hair coat gradually grew thinner and thinner until it disappeared except in a few places, where it is usually retained. There was an accumulation of serum fluid subcutaneously present, as seen in photo, in the abdominal region periodically, which was easily dispersed by milking the teats. The testicles and prostate glands were enlarged, indurated, sheath swollen, and a nasty greenish-coloured pus discharge issued from the urethra during micturition, which was performed with difficulty; hæmaturia, noticed first, later on turned to green purulent smelling discharge; animal squatting like a bitch,



Alopecia and Carcinoma in the Dog, illustrating Mr. Eve's Article.

and towards the last dribbled away involuntarily. The dog ate its food, which consisted of the best of everything, voluntarily. Great thirst was noticeable, and bowels habitually constipated, breath very offensive and oral sepsis present.

Diagnosis.—Doubtful whether dry eczema, follicular mange, or alopecia, so decided to make a microscopical examination for "parasite"—result negative.

Prognosis.—Guarded, unfavourable; advised owner that it would be a long unsatisfactory case, I feared, and suggested that the disease might be of an "hereditary nature" and incurable. Last week I suspected some internal growth, probably cancer, which post-mortem revealed lesions present.

Treatment.—Dosed animal for worms, gave Beta-naphthol and salol internally for a time, followed on with Blaud pill and arsenic (℞ Acid Arsenios, gr. 1-120, Ext. Nux. Vomica, gr. ⅛), Pil: Blaud, gr. v. Gave medicated baths (sulphurata periodically, potass), applied externally medicinal paraffin and bismuth sub. nit., which seemed for a time to improve the condition of the skin. Finally tried a hair-tonic lotion, containing borax, acid salicylic, pilocarpine nitrate, cantharidine, glacial acetic acid, phenol and bay rum, which was rubbed into the skin with friction, but with *no success*. Sprayed mouth with H_2O_2 and euthymol (P. D. & Co.) alternately. The constipation was overcome by gastro-intestinal lavage, followed by the internal administration of pure liquid medicinal paraffin. Douched the urethra twice daily with astringent and antiseptic injections ℞ Alum, Tinc. Sulph, Fl. Golden Seal, Morphine Sulph., Tannic acid and Boric acid (Parke, Davis & Co. tablets), and gave cubeb compound internally.

Diet.—Barley water, Vichy water, and milk, tripe, raw meat, charcoal biscuits, boiled rice and fish.

Post-mortem.—Kindly made by Mr. G. Mayall, M.R.C.V.S., to whom I sent the carcass for his inspection and opinion, who reports interesting lesions of "carcinoma" of the bladder present, which perhaps accounts for the "Alopecia" due to "Trophic Neurosis," as a result of pressure of the tumour on the spinal cord.

Lesions.—Carcinoma of the bladder and testicles. The growth on the bladder weighed 10½ ounces, and only about one-quarter of the organ was present.

AGGLUTINATION OF THE BLOOD CORPUSCLES AS A SIGN OF PREGNANCY.

By E. MORGAN, M.R.C.V.S, D.V.H.
Puerto Cabello.

VETERINARY surgeons are often consulted and asked to give their opinion whether an animal is pregnant or not. When the animal is in an advanced stage of pregnancy, it is an easy matter to form an opinion. The difficult cases are those which are in the first stage of pregnancy, or, as is often the case, non-pregnant. Animals are often sold as pregnant, and soon the buyer is anxious to know whether the animal is pregnant or not. I have often been called to give an opinion, and find in many cases that one cannot possibly base an opinion one way or the other. Often have I wished to hear of somebody discovering some reliable test, so as to diagnose such cases. The other day, whilst reading the current medical literature in the *Journal of the American Medical Association*, I came across the following, which might possibly in time be of use to Veterinary Surgeons, the same as it is to practitioners of human medicine :—

April 15, 1918. 80, No. F.

HYGIEN STOCKHOLM.

AGGLUTINATION OF THE BLOOD CORPUSCLES AS A SIGN OF PREGNANCY:—Fahræns remarks that the dictum in recent text-books, to the effect that the blood in pregnancy shows no specific modifications from normal will have to be amended, as his research has shown a marked change in the agglutinating properties of the red corpuscles. Citrated blood from pregnant women showed a much more pronounced and more rapid sedimentation of the red corpuscles than the citrated blood from non-pregnant women. Sedimentation proceeds abnormally fast in the blood of the pregnant and in the blood of women in general compared to men. He records the height of the sediment thrown down in one hour in 103 persons. In the thirty-seven non-pregnant women it never reached above the 11 mm. mark; in the fifteen men tested, it never reached even 5 mm., but in all but two of the pregnant women it reached a height of from 15 to over 80 mm., the sedimentation growing more and more rapid with the progress of the pregnancy. He found further that this accelerated sedimentation occurs as a constant symptom of certain pathologic conditions; and hence, with the possibility of these, its significance as a sign of pregnancy must be carefully weighed. As he expresses the phenomenon, the stability of the suspension of blood corpuscles in the blood is more pronounced in men than in women, and the stability is materially reduced in pregnancy. This seems to be a kind of defensive reaction, and the strength of the reaction can be measured by the amount of sediment thrown down in a given period of time.

He gives an illustration of a fine glass graduated tube, inside a large glass tube filled with water, at body temperature, in which the sedimentation can be watched. He also describes a means to apply the sedimentation test to the living subject. A view in the forearm is selected that does not show branches, and a rubber tube is fastened round the arm above and below a stretch of about 10 cm. of the vein, thus shutting off the circulation, and the arm is held vertical for fifteen minutes. At the end of this time the vein is punctured, just below the upper constricting tube. In a pregnant woman, nothing but plasma will be found in the vein at this point, the corpuscles having settled to the bottom of the vein segment. In other women and in men the puncture shows whole blood as usual. The settling down of the corpuscles, leaving only plasma, at the top is evident even without the puncture by the change in the tint of the vein at the upper end of the segment. His findings seem to parallel the Abderhalden defensive reactions, and sustain Abderhalden's theory concerning them.

RUPTURE OF THE AORTA.

By R. HUDSON, F.R.C.V.S.
Retford.

THE subject was a thoroughbred hunter which had been raced, and owing to the war had been at grass for two years.

He had been lent to an officer to hunt, and had been doing light work for about three weeks.

On the day the accident happened he had been taken to a meet of

Rupture of the Aorta, illustrating Mr. Hudson's Note.

hounds with a view to giving him exercise; the rider recognised his unfit condition, and while cantering he suddenly fell and expired.

Post-mortem examination showed a rupture of the aorta just above the valves and a large accumulation of fat underlying the peritoneum.

It was obvious that it would have taken months of slow work to have prepared the animal for fast work.

VASCULAR GROWTHS ON SHEEP.

By R. HUDSON, F.R.C.V.S.
Retford.

FOUR in-lamb Lincoln ewes belonging to a small flock were noticed by the owner to have sores about the upper lip and nostril, which were spreading very rapidly, until in two days one had reached the size of a crown piece.

The sheep had been away on turnips, and were now on grass, having been home about a fortnight.

They were in good condition, and receiving—since coming home—an allowance of compound cake.

The sores, when I saw them on the third day from the time they were first observed, took the form of vascular growths, bleeding freely when touched, soft, about half an inch to one inch in height, and from a shilling to a crown piece in width. Swelling of the lower part of the face was present. The sores existed singly—one sore on one sheep—and only on the upper lip about the nostrils.

The general health was normal, the sheep grazing freely.

They were separated from the others, and for a week no fresh cases have arisen.

Treatment.—The vascular growth was removed—being soft, it was done with the back of the scissors—and the part scraped down to firm tissue, which in some left a circular depression, in others a level surface.

A lotion of formalin, 1 in 40, is being applied, which is keeping down the granulations. Epsom salts and pot. nit. given internally.

I do not know what the cause of the trouble may be. The weather had been frosty, with a little snow about. There was no apparent chance of injury. The sudden change of diet from turnips to grass and cake might have something to do with it, as, when changing on to a rich clover pasture we often get aphthæ.

The feeding of the remainder of the flock has continued the same.

Fourteen days after treatment the sores are almost healed, being covered by a firm scab.

RUPTURE OF THE WOMB, WITH FŒTUS IN THE ABDOMINAL CAVITY.

By R. HUDSON, F.R.C.V.S.
Retford.

THE subject was a shorthorn cow, third calving, now calving a few days before due. She had been attempting to calve for several hours, assisted by the owner, who had roped the fore legs and lower jaw of one calf and could not draw it away. He thought he had felt two calves, but I was doubtful, because one hind leg was between the two fore legs, so obstructing delivery.

It was late at night, and the cowhouse badly lit. Not much time was spent on a general examination of her, but I noticed she was very full in her abdomen, cold about her horns and ears, grunting, and pulse fast and weak.

Enquiry elicited the information that she had not been well for four days, having refused her food and grunted. I thought there was some stomach trouble as a complication.

Examining her, I found plenty of room up to the os uteri, which was only sufficiently dilated to allow the head to pass as far as the eyes. One hind leg was pointing upwards between the forelegs, and having pushed it back, traction was kept up on the calf until the os dilated and allowed it to pass. The calf delivered was small, leading to the assumption that there would be twins; but on examination I was surprised to find I was mistaken; for, although I was stripped, and could feel for some distance, I could not find a trace of a second calf. Examining for any laceration at the os, I found it normal, and did not meet with anything abnormal, not even hæmorrhage.

It was decided that we should wait until next morning before killing her, and the owner wired in that she was worse. A butcher was sent, but he arrived late, the cow having been dead an hour.

Post-mortem examination revealed a calf in the abdominal cavity, the womb having ruptured and allowed its escape.

It was small and swollen, and the butcher told me it was right forward against the liver. The stomach and other organs were normal.

The fact that the cow was ill some days before calving, and the undilated os, point to the conclusion that rupture of the uterus took place before the act of parturition.

Abstracts.

THE EFFECT OF PITUITARY GLAND EXTRACT ON MILK SECRETION IN THE COW.*

By F. B. HADLEY.

Veterinarian of the Wisconsin Agricultural Experiment Station.

For some time it has been known that an extract of the posterior lobe of the pituitary gland increases blood pressure. Observations have also shown that this extract causes an increased flow of urine and milk. To determine the exact effect on lactation, two cows were chosen for an experiment. One was a grade Holstein heifer that had been fresh about six weeks, the other an old pure-bred Holstein cow that had been in milk for seven-and-a-half months. The former was injected subcutaneously with Parke, Davis & Company's Pituitrin, the latter intravenously. Records were taken before and after the injections to show the normal amount and quality of the

*From a Paper read before the Wisconsin Veterinary Medical Association.

milk secretion. The injections were made immediately after the usual morning milking, and the cows were milked again one hour thereafter.

Effect on Yield of Milk.

By referring to the appended records it will be seen that the total amount of milk produced in twenty-four hours was not increased by the Pituitrin. However, the amount obtained an hour after the injections was considerably more than the yield for the corresponding period on the days in which no Pituitrin was injected.

It would seem reasonable to attribute to Pituitrin this temporary increase in milk flow by its action in causing the blood to flow more freely through the udder. However, numerous experiments by investigators have shown that the effect seems to come either from direct action on the epithelial cells of the mammary gland or on the involuntary muscle fibres in the walls of the gland acini. In any event, the milk constituents appear to be set free, rather than formed, as a result of the introduction of the extract.

Effect on Percentage of Butter-Fat.

RECORD OF OLD COW INJECTED INTRAVENOUSLY.

Date.	Hour. A.M. or P.M.	Pounds of milk.	Total milk	Per cent. of fat	Pounds of butter.	Total butter.
12–13	7.15	19·4		3·1p	·601	
12–13	8.20	·4		6·35	·025	
12–13	7.17	14·5	34·3	3·30	·479	1·105
12–14	7.15	15·5		2·95	·457	
12–14	7.20	Inject.				
12–14	8.20	1·9		5·20	·099	
12–14	7.00	6·3	23·7	2·00	·126	·682
12–15	7·20	19·5		3·20	·624	
12–15	8.20	·4		6·60	·c26	
12–15	7·00	14·3	34·2	3·90	·558	1·208
12–16	7.15	15·4		4·15	·639	
12–16	8.20	·3		5·65	·017	
12–16	7.20	15·3	31·0	3·50	·536	1·192
12–17	7.00	12·3		2·60	·320	
12–17	7·20	Inject.				
12–17	8.20	3·5		5·00	·175	
12–17	7.15	15·c	3c·8	3·62	·543	1·038
12–18	7·50	18·2		3·15	·573	
12–18	8.55	6·		3·15	·035	
12–18	7.10	15·3	34·1	3·35	·512	1·120
12–19	8.00	19·3		3·15	·5c7	
12–19	9.10	·5		5·85	·029	
12–19	6.50	15·2	355·c	3·40	·516	1·052
Totals. Av'ges.		223·1	31·7		7·397	1·057

RECORD OF HEIFER INJECTED SUBCUTANEOUSLY.

Date.	Hour. A.M. or P.M.	Pounds of milk.	Total milk.	Per cent. of fat	Pounds of butter.	Total butter.
12–13	7.00	15·1		3·53	·533	
12–13	8.10	1·5		6·90	·104	
12–13	7.00	12·0	28·6	3·90	·468	1·105
12–14	7.00	24·7		3·30	·419	
12–14	7.10	Inject.				
12–14	8.10	4·2		10·05	·422	
12–14	6.50	8·9	25·8	2·90	·258	1·1099
12–15	7.00	14·6		3·80	·555	
12–15	8.10	1·1		6·50	·072	
12–15	6,50	12·6	28·3	3·10	·391	1·018
12–16	7.05	13·6		3·17	·431	
12–16	8·10	·8		7·85	·063	
12–16	7.10	10·3	24·7	4·65	·479	·973
12–17	7.00	13·1		4·65	·609	
12–17	7.10	Inject.				
12–17	8.10	2·9		10·75	·312	
12–17	7.00	8·7	24·7	2·40	·209	1·130
12–18	7.30	13·8		3·50	·483	
12–18	8.45	3·2		9·05	·290	
12–18	7.00	11·5	28·5	3·90	·448	1·221
12–19	7·50	13·8		3·57	·482	
12–19	9.00	2·0		7·30	·146	
12–19	6.40	11·4	27·2	4·25	·484	1·112
Totals.		196·8			7·658	
Av'ges.			26·8			1·094

Effect on Percentage of Butter-Fat.

A comparison of the milk drawn during normal days and those in which Pituitrin was injected will show that in the heifer an increase of about 2 to 3 per cent. in the butter-fat occurred in the milk drawn one hour after the injections. The old cow failed to respond, possibly because the extract was administered intravenously rather than subcutaneously. Other explanations may be found in her greater age, poorer condition, and period of lactation, any one of which may have made her less susceptible to its influence.

These results go to show that the milk-plasma and milk-solids are secreted slower and independently of the milk-fat. If this is true, we can easily account for the increase in the fat of milk when carbohydrates and water are at low ebb in the body.

Effect on Yield of Butter.

Practically no change occurred in the total amount of butter produced in twenty-four hours by either cow. Both yielded several times as much as normally in the milkings immediately following

the injections. This was compensated for by a corresponding reduction on the evening of the same day. It is shown by these observations that Pituitrin, whether administered subcutaneously or intravenously, is capable of causing but a temporary increase in the amount of butter yielded by cows in twenty-four hours, or a longer period.

CONCLUSIONS.

1.—Pituitrin causes a rapid but temporary increase in the amount of milk secreted.

2.—The increase is due to the stimulation of the secretory cells of the udder, instead of the muscular fibres in the walls of the gland acini.

3.—In a fresh young cow in a good state of nutrition it stimulated the production of milk that was richer in butter-fat than that normally produced. This increase was found to be temporary only. An old cow in poor condition, although giving a large flow of milk, failed to show even a temporary increase in the percentage of butter fat.

4.—Although a decided increase occurred in both cows in the yield of butter in the milkings immediately following the injections, the total amount produced in twenty-four hours was not raised.

5.—It is impossible to employ Pituitrin fraudulently in cows that are on official advanced registry tests as a means of increasing either the quantity of milk or its butter-fat content. The reason for this is the very temporary action of the extract, and the fact that it becomes less and less effective even if the dose of Pituitrin is repeated at frequent intervals.—*Veterinery Notes.*

SOME CAMEL FEEDING EXPERIMENTS.

By H. E. CROSS, M.R.C.V.S., D.V.H. PUNJAB.

OUR knowledge regarding the quantity of fodder that a camel requires is very limited, and no experiments have, so far as I am aware, been carried out to determine the quantity of fodder that a camel requires to keep him in condition. Requests having been frequently made by the military authorities for information regarding the quantity of fodder that should be given to camels, it was decided to carry out some feeding experiments on these animals.

The only camels available for the purpose were medium-sized camels suffering from surra (7-14 years old). It would have been much more satisfactory had it been possible to carry out the experiments with non-surra-infected camels, but this it was not possible to arrange. The camel is an animal that can be trained to eat almost anything, and the fodder on which he feeds varies greatly in different parts of the

world. The Punjabi camelmen prefer browsing to stall-feeding, and undoubtedly the camel thrives well if sufficient time is allowed for browsing, and the browsing is of good quality. When the browsing is poor, or sufficient time is not available, fodder such as *missa bhusa* (pea straw), *moth bhusa* (*Phaseolus aconitifolius* straw), and *mung bhusa* (*Phaseolus mungo* straw), and, when in the season, green *tara-mira* (*Eruca sativa*), green *moth* (*Phaseolus aconitifolius*) and green gram are fed to the camels. As a rule the camelman does not feed gram to his camels, being unable to afford it. *Chitta bhusa* (wheat straw) and *phaliyat* (*Eruca sativa* stalks) are occasionally fed. Camelmen, however, do not like *chitta bhusa* (wheat straw) as a camel fodder, and *phaliyat* (*Eruca sativa* stalks) has probably little nutritive value. Without doubt a camel thrives best on fodder and browsing that he has been accustomed to. A camel brought to a district the browsing in which differs from that to which he has been accustomed or when stall-fed on fodder that he has not been used to, will fall off in condition ; but if he is carefully looked after, and only lightly loaded to start with, he quickly becomes accustomed to the change and will rapidly regain his condition.

Experiments regarding the quantity of fodder a camel will eat were carried out with the following :—

(1) Gram and *missa bhusa*.
(2) *Missa bhusa* without grain.
(3) Gram and *moth bhusa*.
(4) *Moth bhusa* without grain.
(5) Barley, turnips and *moth bhusa*.
(6) Gram and green *tara-mira*.
(7) Green *sarson* (Indian colza).
(8) Oat hay and ordinary hay.

The camels got poor browsing during the day : the fodder was given in the evening at about 5 p.m.

Oat Hay and Hay.

Oat hay.—Several camels were fed on oat hay. The oat hay was at first mixed with an equal quantity of *missa bhusa*, the quantity of the latter being daily reduced till finally only oat hay was given. The camels did not relish it, and the largest quantity eaten was 17 lb. The oat hay, however, was of poor quality.

Hay.—Six camels were starved for one day and then fed on 6 lb. of gram and hay.

Maximum Quantity of Fodder Eaten, in Addition to Poor Browsing.

(1) 12 lb. gram and 35 lb. *missa bhusa*.
(2) 6 lb. gram and 35 lb. *missa bhusa*.

(3) 39 lb. *missa bhusa.*
(4) 2 lb. gram and 22 lb. *missa bhusa* (2-year-old camels).
(5) 6 lb. gram and 40 lb. *moth bhusa.*
(6) 45 lb. *moth bhusa.*
(7) 5 lb. barley, 30 lb. turnips, and 40 lb. *moth bhusa*—given in the order named; only 20 lb. turnips per camel given in two days.
(8) 6 lb. gram and 86 lb. green *tara-mira.*
(9) 192 lb. green *sarson.*
(10) 6 lb. gram and 31 lb. hay.
(11) 17 lb. oat hay. Where two foods were used, gram was fed first.

SUMMARY.

The average quantity of fodder eaten, in addition to poor browsing, was as follows:—

(1) 12 lb. gram + 20·6 lb. *missa bhusa.*
(2) 6 lb. gram + 23·1 lb. *missa bhusa*
(3) 24·9 lb *missa bhusa.*
(4) 4 lb. gram + 14.7 lb. *missa bhusa* (2-year-old camels).
(5) 6 lb. gram + 26.7 lb. *moth bhusa.*
(6) 29·9 lb. *moth bhusa.*
(7) 5 lb. barley + 26·6 lb. turnips + 26·4 lb. *moth bhusa.*
(8) 6 lb. gram + 66·1 lb. green *tara-mira.*
(9) 135·4 lb. green *sarson.*
(10) 6 lb. gram + 16·2 lb. hay.

CONCLUSIONS.

Taking into consideration the fact that these experiments were carried out on camels suffering from surra and doing no work, it is probable that healthy camels on hard work would eat very much more. The experiments, however, show that the present government ration of 16 lb. of a mixture of wheat and *missa bhusa* per camel is insufficient—*Agricultural Research Institute, Pusa Bull* (*No. 77.*)

AN OPEN STIFLE JOINT.

BY DR. WILLIAM M. LONG.
Baldwinsville, N.Y.

ON October 18th I was called to see a four-year-old dark bay gelding weighing about 1,350 pounds and in fine condition. The owner stated that the horse had driven a nail into its leg. On arriving at the farm I found the animal in great pain and standing on three legs. Its temperature was 105° F., but it acted bright and was eating.

On close examination I discovered that the nail had punctured the right stifle joint on the median side near the cul de sac at the proximal end of the tibia. The surrounding tissues were very much swollen, hot and painful.

I cleaned the area around the wound by shaving and painting the surface with tincture of iodine. Upon pressure a small amount of clotted synovia was forced out. I next enlarged the skin opening slightly and syringed the joint cavity with 50 per cent. hydrogen peroxide solution. As much of this solution was then squeezed out as possible and about three ounces of a 20 per cent. Lugol's solution in glycerine was injected.

A quantity of this solution was left with the owner with directions to squeeze out the discharge and fill the cavity with the Lugol's solution and glycerine once a day. The owner was also advised to bathe the leg with hot creolin solution. That evening the animal's temperature was 106·6° F.

I next saw the case on October 20th. At that time the temperature was 103° F., the swelling was larger and had extended to the abdominal wall. Much pus and synovia were being discharged. A 1,500 unit dose of tetanus antitoxin was administered, as there had been several cases of tetanus in this locality. The owner was advised to continue the same treatment.

On October 29th the animal's temperature was normal. The swelling was much reduced, and the animal could bear a little weight on the leg. There were no more clots in the discharge, but the synovial fluid was a dirty yellowish-white colour. The Lugol's solution and glycerine were then discontinued and the owner was instructed to use pure glycerine every other day.

On November 5th the swelling was much reduced and more weight could be borne on the leg. The infection had ceased to exist in the joint and only clear synovia was discharged. The wound was kept open about a week longer, after which it was closed by means of a blister. At this time the animal was walking quite well, but a slight swelling was still present.

On November 10th all traces of the swelling had disappeared, and the horse was walking sound. The animal was put to work on November 15th and is apparently fully recovered.—*Cornell Veterinarian.*

THE ETHICS OF THE PROFESSION OF VETERINARY MEDICINE.

By C. F. DAVIS,
Prof. of Veterinary Jurisprudence, Colo. Ag. College, Fort Collins, Colo.

To determine the proper attitude of man towards his Creator forms the field for religious science. To determine his proper relations with his fellow-men is the object of ethics.

In one sense what is right between men in general is right for a

professional man whatever his profession. That is to say, there is no special ethics of a profession. From another point of view every walk in life, inasmuch as it establishes different sets of relations between those who follow it and those with whom they come in contact, has its own peculiar ethical code.

From this point of view we may justly speak of ethics of the medical profession.

From the standpoint of philosophy it may be said that the whole code of ethics is embraced in the rule of conduct announced by Buddha, adopted by the Chinese teacher and repeated by the Christ—to do unto men as we would that they should do unto us.

But the abstract principle will not serve for the guidance of men in masses. There must be the statement of the law in concrete cases; hence men are constantly asking should be their conduct in this or that situation?

To arrive at a fair answer to such a question we should endeavour to discover the origin of ethical laws. Why or how have men come to look upon one course of conduct under certain circumstances as right and the opposite conduct as wrong? Why do we, the descendants of ancestors who saw no impropriety in going entirely unclothed, accept as an ethical principle the demand that all men shall be fully clothed?

There seem to be two lines of thought, each of which has been accepted as leading to the correct answer to our question. One group of thinkers reason that in his development from barbarism to his present stage of civilisation man has made many experiments in many fields. That those courses of conduct which have proved to be inimical to man's efforts to satisfy his ever increasing wants have been avoided, while other courses, having been of assistance, have been retained and insisted upon as right. When men, having dropped their roving, pastoral habits, settled down to a more or less crude form of agriculture and began to look upon the field in which a man had placed the seed and which he had protected from the destructive attacks of savage beasts and lawless men until the harvest was ready as in some way being that man's private property, it would soon become manifest that the sense of ownership aroused an ambition to improve, to beautify, and to remain upon the land. These are all social virtues which have contributed much to the progress of society, and have, therefore, come to be looked upon as right.

The other group of thinkers prefer to look upon man as a creature of habit and to say that whatever men persist in doing until the habit of doing it has been formed, they will continue to do, and will finally come to consider the doing of it right and the omission of it wrong.

They point to the many actions which, while they are made the subject of ethical rules, cannot be said to be either advantageous to society or the reverse.

Whichever of these views we may choose to accept, we will find it difficult to deny that that course of conduct which has come to be considered right between man and man is conducive of good results in that it serves as the lubricant to prevent friction in society.

One who enters upon the practice of a profession has a five-fold duty; he has his duty to himself, his duty to his profession, to his professional brethren, to those who employ him, and to society at large. To himself he owes it that his conduct be such as to command the respect of all men. That he be recognised as one who has drunk at the fountain whence flow streams of pure wisdom.

To his profession is due that dignified attitude which will show that he harbours no thought that it requires an apology for having entered upon it.

The practice of veterinary medicine was for so many years given over to the blacksmith and the stable-boy that people now find it difficult to believe that it has become an art requiring for its successful practice as thorough and careful preparation as that given to the practitioner whose efforts are directed to the healing of diseases to which humanity is heir.

Law, medicine and theology have long been known as the learned professions, and the men who have practised them have for centuries ranked among the leaders of thought and the patterns of right conduct in society. When the student of veterinary science essays to enter into companionship with such men on the footing of full intellectual equality he owes it to them and to himself to make himself worthy of that companionship. Any crudeness of manners, any lingering rudeness of the old-time "horse-doctor," any failure by his conduct to claim full recognition belonging to a polished and learned gentleman must result in his being looked upon as of less worth than the members of the well-established professions.

As to the duties of the veterinarian to others, from the standpoint of ethics, they differ in no way from those of the physician who gives his attention to the ills of humanity. I have found the ethical principles which have come to be recognised as binding upon members of the medical profession so well expressed by others that I take the liberty to make rather large quotations from their writings.

"It is perfectly ethical to advertise by giving your cards to those who employ you and to others who may at some future time need your services, but it is considered unprofessional to state where you graduated and how long you have practised, either upon your cards or in the newspapers."

When you are the first to reach a case in which the excitement or alarm for the safety of the patient a number of doctors have been summoned, with no special choice among them, you should promptly send a trusty messenger to cancel the call of the others and thus save them the unnecessary visit.

A decent respect for the opinion of the world should lead you to keep within the limits of good taste in everything, and to practise all that constitutes politeness in dress and deportment.

Signs and cards reading "practice limited to certain fields of practice" are perfectly ethical; but those that read, "special attention given to certain forms of disease" are not.

While it is perfectly just and proper to seek reputation by all legitimate means, and to embrace every fair opportunity to make known your attainments, all low intriguing and sensational scheming to obtain practice is unethical.

You should determine that in all your efforts you will play the man, from your diploma to your deathbed; that you will begin well, continue well, and end well; and will do nothing that is criminal, nothing that will not stand the strongest sunlight and the severest scrutiny; nothing for which you would hesitate to sue for your fee; and, if necessary, to stand up before a judge and jury to claim it; nothing, in fact, that you cannot approve of with your hand on your heart.

Nothing is more highly unethical than the exhibition of unprofessional tricks. The practice of medicine is an honourable calling, and every person who enters upon it should resolve that it shall not be looked upon as in any way less honourable because he has adopted it.

Honour and duty require you to do right not only because it is good policy, but because of the higher reason that it *is* right.

Like every other physician, you will have friends to favour and extol you, and both secret and open enemies to oppose and decry you, and, although you can neither stop the tongues of the latter nor prevent their unfavourable criticism, still you should be careful that nothing be permitted to blast your reputation for upright, honourable conduct. Charges against your skill, unless very grave and damaging, had better be left unnoticed, or passed over with indifference.

One of the most unethical things that a practising physician can be guilty of is to boast of the number of cases he has on hand, or of the wonderful success that has attended his efforts.

The United States seems to be the only country in which there exixis a written code of ethics for the medical profession.

It may be that other countries from long custom are able to dispense with them. But in this land, where all social customs are still in the

formative stage, the very nature of society and the jarring of interests require that physicians shall have some general system of written ethics to define their duties, and, in case of doubt, to regulate their conduct towards each other and the public in their intercourse and competition.

Every individual in the profession is, of course, supposed to be a gentleman, actuated by a lofty professional spirit, striving to do right and to avoid wrong, and, even were there no written rules at all, the vast majority would conform to the rules of justice and honour.

The non-existence of a code would make it possible for unscrupulous practitioners to pounce upon the patients of well-bred physicians like hungry wolves, and to carry on a regular system of infringement, self-advertising, certificate giving, and wrong-doing in general, regardless of their rights, while those aggrieved would have no visible standard of appeal.

In view of these facts there has been adopted a code of ethics in this country which is recognised as binding upon every physician who is qualified and admitted to the practice of medicine.—*Journal of the A. V. M. A.*

IMMUNISING PIGS AGAINST SWINE FEVER.

THE following from the *Cornell Veterinarian* for January, 1918, is an extract from a paper by R. R. Birch, of Ithaca, and at the present time will interest our readers :—

The herd to be immunised often presents peculiar difficulties because it so frequently consists of a miscellaneous collection of hogs of all sizes and ages, and in all conditions. The general plan followed is to give simultaneous treatment to all animals that are in condition to receive it, and at the same time to give serum alone to those which on account of small size, poor condition, late pregnancy, or recent farrowing are not fit subjects to receive virus. These are rendered passively immune until the time arrives when they may receive simultaneous treatment in comparative safety.

When a herd immunity is once established the problem becomes greatly simplified. The pigs of immune sows are less likely to contract cholera at an early age, and they can be immunised while comparatively young, at a time when they are easily handled, when the cost of serum is light, and when the risks incident to immunisation are at a minimum.

Considerable experimental work must yet be done before we can say with certainty just what is the best system to follow in immunising young growing pigs, in herds where hog cholera virus must be regarded as being constantly present. We must content ourselves for the time being with outlining a system that has given excellent results throughout a term of years.

Briefly, this system consists of castrating the pigs when they are about four weeks old, giving serum alone at four to six weeks of age, weaning at seven to eight weeks of age, and giving serum and virus at nine to twelve weeks of age. In following this system it is presupposed that active infection is not present—that is, that there are no sick pigs in the herd—and that the animals are maintained in good growing condition. For purposes of identification we have found it convenient to notch the left ear when serum alone is administered, and the right when the animal receives simultaneous treatment.

This general system has to be varied according to circumstances. Sometimes pigs of immune sows will not live four weeks before they begin to contract cholera, and in these instances serum alone must be given as soon as the disease appears. Cases have also been reported to us in which herds of pigs did not remain immune a month after receiving serum, but we have observed this only in a few individuals—never in a considerable portion of a herd. Here, again, the appearance of cholera would call for immediate serum treatment.

As a rule it will be found advantageous to delay giving serum alone to the young pigs as long as it can be delayed in comparative safety, and also to delay simultaneous treatment until the pigs have attained a weight of fifty pounds, but in either case careful watching is necessary. In whatever way the system is varied, pigs should not receive virus at castrating or weaning time or while they are generally unthrifty. Neither should they receive it while they are so young that a permanent immunity will not be established.

The technique of serum treatment appears so simple that essential points are sometimes overlooked. In treating young pigs special care is necessary. The dose should be divided, the inner region of each ham receiving half the amount required. Then the hams should be kneaded gently a moment to prevent encapsulation and aid absorption. Dry quarters should be provided for the pigs during the first few days following treatment. Except in severe weather it is well to work out of doors, and in all cases the serum receptacle should be covered to prevent dust contamination. In injecting animals too large to be thrown conveniently, the needle should be inserted quite deeply and in a downward direction into the loose tissue immediately behind the ear. Unless the serum flows freely from the syringe the position of the needle should be changed until but little force is required in making the injection. Here, again, vigorous massage following the injection will help to prevent encapsulation, which is especially likely to occur when it is found necessary to inject behind the ear. Injecting high in the neck is to be avoided, for the dose is

likely to find lodgment in the thick layer of fat immediately beneath the skin at this point, and rapid absorption cannot be expected.

Careful attention to these seemingly trivial details, together with special precautions regarding the surgical cleanliness of instruments and site of injection, will eliminate much danger from abscesses, and ensure more prompt and effective action on the part of the serum.

Reviews.

MASTITIS OF THE COW. By Sven Wall, of the Veterinary School at Stockholm. Translated, with annotations, by Dr. W. J. Crocker, B.S., V.M.D., Professor of Pathology, University of Pennsylvania. Published by J. B. Lippincott Co., Philadelphia and London. Price 12s. 6d.

This book can be heartily recommended to all those who desire to know what a complex organ the udder of the cow is, and how liable it is to ailments, many of which seem to be very formidable. One may become rather pessimistic after its perusal as to diseases of the cow's udder being remediable, and little will be found in the book as to remedying defects, but the reader will probably adopt a revised view as to the cow's udder being merely a machine to be constantly worked, and a determination to do all he can to take care of it, and treat it as a rather delicate structure needing careful handling, and be led to the conclusion that keeping it healthy pays far better than treating it when it is diseased. To pathologists the book is of exceptional interest. The conclusions arrived at have been based on the autopsy of diseased udders, and experiments and investigations with fluid derived therefrom. There are 18 chapters in the book, and from them we learn how the udder may be the seat of single or complex infections, and all about the various bacteria concerned in the production of the different forms of manimitis. The first chapter on the anatomy and physiology of the udder is short and concise, and gives present-day information without going into debatable points. Udder tuberculosis, as may be expected, is fully discussed in the book. The volume is well printed and bound, and contains 127 good illustrations. In view of the prevalence of manimitis and its importance to the milk producer, the work should have a good circulation, but we do wish therapeutics as regards the udder of the cow was in a stronger position to effect benefit.

DEPARTMENT OF AGRICULTURE.—British East Africa. Annual Report 1916-1917. Printed by the Government Printers. Nairobi.

The various directors, managers and chiefs give their separate reports in this publication. Advancement in plant, vegetable and animal life is indicated all along the line. The pig industry has been encouraged and in a country with a very large production of maize, barley and other food products there is ample scope for its development. A large factory with cold storage has been erected at Escarp-

ment and 31,000 lb. of pig products have been turned out per month. The report of the Veterinary Department is compiled by Mr. R. J. Stordy and deals with the control and treatment of the diseases of cattle, horses, goats, sheep and pigs in the area.

Mr. R. E. Montgomery, the veterinary pathologist, gives an account of the work done in his department: 266,096 doses of anti-rinderpest serum were manufactured during the year and 397,602 doses were issued. Much pathological material was also examined and many vaccsines prepared. G. M

Obituary.

THE LATE CAPT. G. C. TAYLOR, R.A.V.C.

THE death of Capt. G. C. Taylor, of the Royal Army Veterinary Corps, took place on the 16th of October last in France as the result of wounds caused by a bomb dropped from an aeroplane. The son of Mr. Charles Taylor, M.R.C.V.S., of Nottingham, and only 23 years of age, Mr. Taylor had a very successful college career, and immediately upon taking his diploma "joined up" in the Veterinary Service and was sent to the French Front within a fortnight. He had served his country for two and a half years, and it was whilst working in an exposed place one day that a bomb from an aeroplane burst near him, wounding him severely. He fell into the arms of an officer friend and died in a few hours. Our sympathies go out to his sorrowing family, for his life had seemed full of promise, and had he lived there is no doubt he would have carried on very successfully the well-known practice already built up by the father.

NOTICES.

All communications should be addressed to 8, Henrietta Street, Covent Garden, London, W.C.2. Telephone: Gerrard 4646. Telegrams: "Baillière-Rand, London."

Letters for the JOURNAL, literary contributions, reports, notices, books for review, exchanges, new instruments or materials, and all matter for publication (except advertisements) should be addressed to the Editor.

Manuscript—preferably typewritten—should be on one side only of paper, marked with full name of author.

Illustrations for reproduction should be in good black or dark brown ink on white paper or card.

Advertisements and all business matters relating to the JOURNAL should be addressed to the publishers, Messrs. Baillière, Tindall and Cox.

Annual Subscription for the British Empire, 18s., post free; for the United States, $4.50; or combined subscription with the "Veterinary News" (weekly), 30s., post free.